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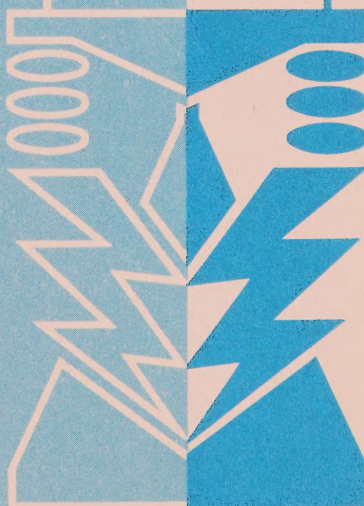
DEVELOPMENT OF ELECTRIC POWER I N C A N A D A

Progress Report—1962



BULLETIN No. 2720—62

JANUARY 1963



Canada

DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES

WATER RESOURCES BRANCH

DEVELOPMENT OF ELECTRIC POWER I N C A N A D A

A report on progress in the construction of hydro-electric
and thermal-electric power generating facilities during 1962.



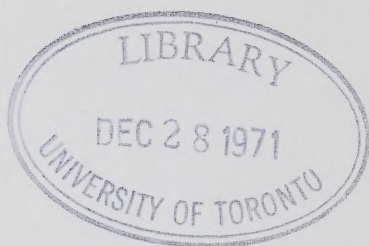
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DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
WATER RESOURCES BRANCH

DEVELOPMENT OF ELECTRIC POWER IN CANADA

A report on the development of electric power in Canada, prepared by the Canadian Council of Ministers of the Environment, 1971.



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Québec Hydro-Electric Commission
New Brunswick Electric Power Commission

DEPARTMENT OF ENERGY AND NATURAL RESOURCES
WATER RESOURCES BRANCH

TABLE OF CONTENTS

	Page
General Review	5
Progress in the Provinces and Territories	
British Columbia	7
Alberta	12
Saskatchewan	14
Manitoba	16
Ontario	19
Québec	23
New Brunswick	30
Nova Scotia	32
Prince Edward Island	33
Newfoundland	33
Yukon and Northwest Territories	35
Development of Electric Power Generating Facilities - Summary	
Part 1 - Hydro	37
Part 2 - Thermal	43

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DEVELOPMENT OF ELECTRIC POWER

I N C A N A D A

General Review

The following review presents for 1962, the results of a regular annual survey carried out by the Water Resources Branch, covering the field of current hydro-electric and thermal-electric power development throughout Canada. The Branch is indebted to provincial authorities and to power producing and distributing agencies for their co-operation in assembling and making available the information from which the review has been compiled.

During 1962, Canada's total electric power producing capability was increased by the installation of 415,468 hp. of hydro-electric turbine capacity and 713,210 kw. of thermal-electric generating capacity. Thus, for the second consecutive year, the amount of thermal-electric capacity installed exceeded that of hydro-electric capacity. Installation of the new hydro capacity was confined to the Provinces of Québec, New Brunswick and Newfoundland, while thermal capacity was added in all provinces except Nova Scotia and Saskatchewan.

In 1963, installation of hydro-electric facilities will predominate with current construction expected to yield about 1,203,600 hp., considerably more than the scheduled 660,500 kw. of new thermal installations.

On the basis of the most recent information available, developments scheduled for completion in the years subsequent to 1963 will produce almost 7.7 million hp. of hydro-electric and nearly 2.1 million kw. of thermal-electric capacity. Development of Quebec's Manicouagan and Outardes Rivers is expected to increase the Province's hydro capacity by over 5 million hp., and accounts for the major portion of the proposed 7.7 million hp. In addition, plans and initial preparatory work are in hand for a number of developments which eventually will add a further 5 million hp. to Canada's developed hydro capacity. Most of this would become available with the development of two sites on the Peace River in British Columbia.

The installation of 415,468 hp. of hydro-electric capacity in 1962 raises the total of hydraulic turbine capacity in Canada at the end of 1962 to 27,100,000 hp. During the same period, the total thermal-electric capacity in Canada was raised to over 5,660,000 kw. by the net addition of 713,210 kw. during the year.

The recent trend to increased development of thermal-electric power is reflected by the preponderance of thermal over hydro installations in 1961 and 1962. This reversal of past practice stems partly from the fact that many of the hydro-electric sites considered economic under existing conditions have been developed, and partly from the increasing recognition of the benefits to be derived from the integrated operation of hydro-electric and thermal-electric power plants.

Recent rapid advances in the techniques of extra-high-voltage transmission have provided a means of transmitting hydro-electric power from relatively remote sites to demand areas at costs competitive with costs of thermal-electric power. As a result, decisions have been made to develop a number of hydro-electric power sites which had previously been considered outside the economic transmission range.

The Federal Government recognized the development of long distance facilities as a possible opportunity to make more effective use of Canada's water power resources. In March of this year, the Department of Northern Affairs and National Resources convened a federal-provincial conference to consider the problems involved, not only in the transmission of electrical energy over long distances, but also in the possible formation of a national power grid. As a result of the conference and subsequent consideration by a working committee, consulting engineers have been engaged to initiate studies of the various aspects of the problem.

Subsequent sections of this review contain details, by province or territory, of progress during 1962 in the construction of new generating capacity, and additional transmission and distribution facilities, with an estimate of further development anticipated for 1963 and the years following. A summary of the 1962 increases in hydro and thermal capacities and a list of total installed capacities by province and territory are appended.

Copies of this annual bulletin may be obtained free of charge from the Director, Water Resources Branch, Department of Northern Affairs and National Resources, Ottawa, Canada.

Progress in the Provinces and Territories

British Columbia

During 1962, several hydro-electric sites were under construction or were being surveyed for possible future development in British Columbia; however, no new hydro-electric capacity was brought into service. The total installation scheduled to be commissioned in 1963 amounts to 120,000 hp.

In the thermal-electric field, a net total of 182,325 kw. of generating capacity saw initial service in 1962. An additional 180,000 kw. is scheduled for completion in 1963 and another 600,000 kw. over subsequent years.

On 30 March 1962, as a result of legislation enacted by the Government of British Columbia, the British Columbia Power Commission and the British Columbia Electric Company Limited were

amalgamated under the name, British Columbia Hydro and Power Authority.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

In 1962, two contracts for preliminary projects associated with the future development of the Peace River were completed. One of these covered the construction of a 500-foot steel-arch access bridge approximately two miles upstream from the Portage Mountain site. The other involved the driving of a pilot tunnel to obtain information for subsequent construction. Work was started on three 48-foot diversion tunnels for completion in 1963. Each tunnel will be 2,500 feet long and will be used to divert the flow of the river during construction of the Portage Mountain dam. The preparation of drawings and specifications for the Portage Mountain plant continued during the year and it is anticipated that the contract for the main dam will be awarded in 1963. The first power is scheduled to be available by 1968. Preliminary plans indicate a feasible installation of up to 4,200,000 hp. at two sites on the river.

An active programme of investigation of the Duncan Lake, High Arrow and Mica storage developments was continued. These three developments, which constitute the basis of the Columbia River Treaty signed on behalf of Canada and the United States on 17 January 1961, would be capable of controlling approximately twenty million acre-feet of usable storage in Canada. The Treaty provides that Canada will receive one-half of the power benefits which result in the United States from the regulation of 15.5 million acre-feet of this storage and one-half the value of the estimated flood damage prevented in the United States through operation of the projects for flood control. The Treaty has not yet been ratified by Canada.

Initial operation commenced at the Burrard Thermal-Electric Generating Station near Vancouver, with the completion of a 150,000-kw. unit. A second similar unit, in the preliminary stage of commissioning, is expected to be on line early in 1963. Work on a third unit for operation in 1964 is continuing on schedule. The ultimate generating capacity of the Burrard plant will be 900,000 kw. in 6 units.

Increases in the capacities of several of the Power Authority's smaller thermal plants also occurred during the year. In the interior of the Province, two units with a combined capacity of 2,000 kw. were installed at Prince George, raising that plant's capacity to 23,000 kw.; at Chetwynd, the plant capacity was increased to 3,000 kw. following installation of 1,800 kw. in two units. At Sandspit on the Queen Charlotte Islands, a new 1,200-kw. plant was brought into service while the capacity of the Alert Bay plant on Vancouver Island was increased to 1,200 kw. following installation of a 150-kw. unit. Increases in the capacities of plants at Fort Nelson, Valemont, Hazelton and Houston

had been forecast for 1962, but installation of these additional units has not taken place. Existing plants of 1,800 kw. and 275 kw. at Williams Lake and Spences Bridge respectively, were removed from service.

During the summer of 1962, extensive surveys and studies were undertaken for the location and design of transmission lines inter-connecting the Bridge River system with Prince George to the north, and with Kamloops to the east. A line from Bridge River to Kamloops, some 54 miles long, would extend the Power Authority's integrated system by the inclusion of the Whatshan and Shuswap Falls Hydro-Electric Developments. The Kamloops area is already connected to the facilities of the West Kootenay Power and Light Company Limited and the Consolidated Mining and Smelting Company of Canada Limited. Both the Kamloops interconnection and the 258-mile line to Prince George would have capacities of 230 kv. The line to Prince George is scheduled to be completed as far as Williams Lake in 1963, while the line to Kamloops has not yet been scheduled. Construction of the 120 miles of line from Williams Lake to Prince George also remains to be scheduled. During 1962, a total of 173 miles of 60-kv. line was placed in service, including 39 miles of line between Chetwynd and Hudson Hope which will be operated initially at 60 kv., but ultimately at 138 kv. Also included in this total of new lines is a 40-mile extension from Hope to Boston Bar. This necessitated the construction of a substation with a capacity of 3,000 kva. to terminate the line at Boston Bar.

At the end of 1962, the Power Authority was serving 65,000 rural customers, including some 19,000 farm accounts.

CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED

Installation of the third unit at the Company's Waneta Hydro-Electric Development on the Pend d'Oreille River, was continuing on schedule with initial service to commence in April 1963. The unit will consist of a turbine, rated at 120,000 hp. under a 210-foot head, connected to a generator of 72,000 kw. at 0.80 power factor.

Because of expansion in the Company's industrial production, additional substation capacity totalling 60,000 kva. is under construction at Kimberley, for service in the spring of 1963.

Early in March 1962, the east tower supporting a two-mile section of the Company's transmission line spanning Kootenay Lake was sabotaged, disrupting service to Kimberley and the Creston area. A temporary span, erected within four weeks, restored partial service. A replacement installation was completed in October.



A 345-kv. transmission tower serving the Fraser River Valley

MACMILLAN, BLOEDEL AND POWELL RIVER LIMITED

In 1962, work was completed on the installation of a 25,000-kw. steam unit at the Company's Port Alberni plant and also on a 4,000-kw. unit at its Harmac plant at Nanaimo, raising the plant capacities at these locations to 27,000 kw. and 5,250 kw., respectively. At the Harmac plant, an additional unit of 30,000 kw. is scheduled to be installed by October 1963.

BAMFIELD POWER AND LIGHT COMPANY

In 1961, the Company applied for and received authorization to supply the power needs of the Bamfield area, in the southwest portion of Vancouver Island. In 1962, the Company began initial service with the installation of a diesel engine coupled directly to two 125-kw. generators.

CITY OF REVELSTOKE

A survey made in the Cranberry Creek watershed for additional storage is expected to result in the construction of a dam at the outlet of Coursier Lake to provide increased storage. Construction of the dam is not expected to start before 1963 at the earliest.

The availability of adequate storage would be particularly significant should the City of Revelstoke decide to increase the capacity of its Cranberry Creek plant. The present capacity of the plant is 5,800 hp. in one unit. However, there is provision in the powerhouse for a second unit.

WEST KOOTENAY POWER AND LIGHT COMPANY LIMITED

During 1962, the Company completed the installation of new substations as follows: 5,000 kva. at Keremeos; 8,000 kva. at Creston; 5,000 kva. at Castlegar; and single units of 10,000 kva. and 5,000 kva. in Kelowna. The first stage of a 161-kv. wood-pole, H-frame, transmission line between Trail and the southern part of the Okanagan was also completed. Only 36 miles of a total of 112 miles were involved in this first stage; the remaining 76 miles of line are scheduled for completion in 1965.

EAST KOOTENAY POWER COMPANY LIMITED

At the end of 1962, the Company was servicing 279 rural customers in British Columbia, including 74 farm customers. In addition, the Company was servicing 144 farms in Alberta.

Alberta

The Province's total hydro-electric generating capacity did not increase during the year nor is any increase anticipated until late in 1964 when 200,000 hp. are scheduled to be placed in service on the Brazeau River.

In thermal-electric development, one 150,000-kw. unit was installed at Wabamun.

CALGARY POWER LTD.

Calgary Power Ltd. continued construction of a hydro-electric development at Big Bend on the Brazeau River. The storage dam, creating a reservoir of 350,000 acre-feet, has been completed and construction of the powerhouse eight miles downstream from the dam is continuing. Water from the reservoir will be carried to the penstocks and powerhouse via a canal which will follow the south bank of the river. A single 200,000-hp. unit is expected to be in service late in 1964. Installation of additional units will necessitate increasing the height of the storage dam.

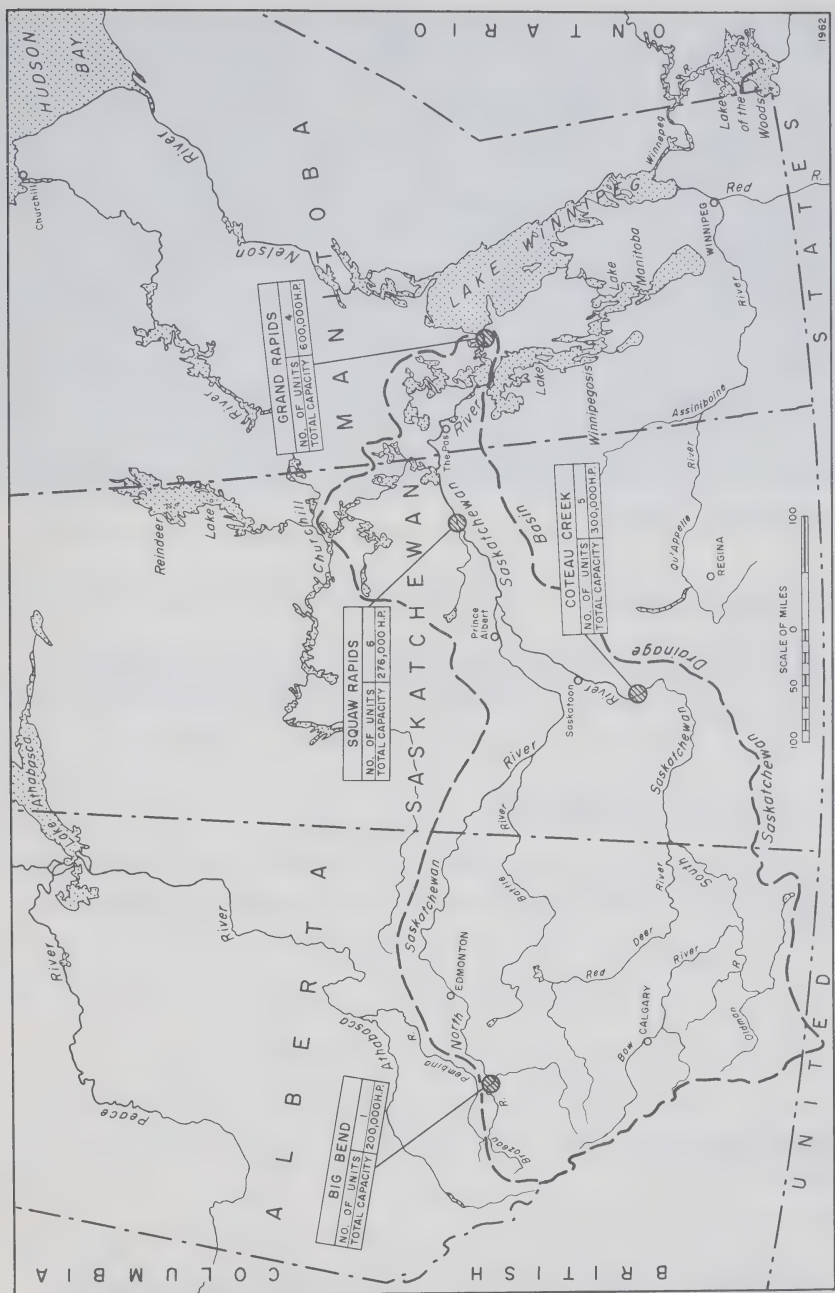
The Company completed the addition of a 150,000-kw. unit at its Wabamun plant, raising the installed capacity to 282,000 kw. in 3 units.

A net increase of 281.5 circuit miles of transmission line was reported for 1962, raising to 5,472 circuit miles the total length of lines maintained by the Company. The major portion of the new line, some 240 miles, has a capacity of 230 kv., a significant increase over the 132-kv. transmission voltage which previously was the highest used in the province. New substations with capacities totalling 311,000 kva. were added during 1962, the largest new station being the 240,000-kva. Sarcee Substation in Calgary. Extensions to existing substations accounted for additional new capacity in the amounts of 180,000 kva. at Wabamun and 2,500 kva. at Stirling.

NORTHLAND UTILITIES LIMITED

In 1962, a net decrease of 15 kw. in generating capacity occurred at the Company's Fort Vermilion plant as a result of replacing two units totalling 90 kw. with a single 75-kw. unit.

Transmission and distribution lines were extended by 26 miles of 25-kv. line and 125 miles rated at 14.4 kv. or under. These new additions have extended the Company's network to a total of 333 miles at 25 kv. and 2,346 miles at 14.4 kv. or under. The total of 152 miles of 72-kv. line remained unchanged over the year.



Hydro-electric power developments under construction in the Saskatchewan River Basin

The Company added a 5,000-kva. transformer at its Fairview Substation and 72-kv. breakers at the Fairview and Nampa Substations.

CITY OF EDMONTON

The City of Edmonton continued the installation of a 75,000-kw. steam unit in its municipal thermal-electric plant. Extension of the building has already been completed and installation of the boiler and generating unit was underway. The new unit is expected to be in service by 1 May 1963.

During the year, the capacity of one of the city's bulk substations was raised from 30,000/40,000 kva. to 60,000/80,000 kva., while the capacity of a distribution substation was increased by 7,000 kva.

The City added 3 miles of 72-kv. line, forming a second circuit on an existing line of poles.

CITY OF MEDICINE HAT

The City of Medicine Hat completed construction of one mile of 13.8-kv. transmission tie-line and added a 3,000-kva. substation to its municipal system.

ALBERTA POWER COMMISSION

The Alberta Power Commission reported that some 58,536 farm customers in Alberta would be receiving electrical service at the end of the year.

Saskatchewan

No new electric capacity, either hydro or thermal, was placed in service in the Province during 1962. However, 187,600 hp. of hydro-electric capacity is scheduled for installation in 1963 with a further 367,600 hp. expected to be added in subsequent years. On the other hand, no new thermal electric capacity is scheduled for service in 1963 or in subsequent years. Instead, it has been reported that two existing thermal plants with a combined generating capacity of 59,700 kw. will be closed down at the end of March 1963.



Spillway structure at the Squaw Rapids Hydro-Electric Development on the Saskatchewan River

SASKATCHEWAN POWER CORPORATION

Construction at the site of the Corporation's Squaw Rapids development on the Saskatchewan River continued on schedule during 1962. The units, eight in all, will consist of turbines rated at 46,900 hp. under 107 feet of head, connected to generators of 34,000 kw. Units 1 to 4 are to be commissioned at intervals from February to September 1963, two others are scheduled for service in 1964 and the remaining two, in 1966. When completed, the development will have a total installed turbine capacity of 375,200 hp.

The Prairie Farm Rehabilitation Administration of the Department of Agriculture (Canada) continued construction of its Saskatchewan River dam and reservoir during 1962. The dam and reservoir are being provided for irrigation purposes, but hydro-electric generation facilities will be included. Installation of these facilities will be the responsibility of the Saskatchewan Power Corporation which plans initially to install three units, each of approximately 60,000 hp., with the possibility of extending the installation to include two additional units, giving an ultimate capacity of 300,000 hp. Three of the five dewatering conduits which were used to aid construction of the dam are being lined with steel and will serve as penstocks to carry water to the powerhouse. Two units are expected for service in 1967 and the third unit in 1968.

The Corporation expects to connect the cities of Moose Jaw and Prince Albert to its provincial grid system by March 1963. When this occurs, the Corporation's generating stations at Moose Jaw and Prince Albert, having capacities of 37,500 kw. and 22,200 kw. respectively, will then be closed down.

The Corporation's programme of constructing transmission

facilities called for completion at the end of 1962 of a 138-kv. line from Pasqua to Assiniboia and of 72-kv. lines from Humboldt to Cudworth, from Willow Bunch to Readlyn and from Hawarden to Loreburn. At the year's end, a 230-kv. line, to be energized initially at 138 kv., was being constructed to link the Queen Elizabeth Generating Station at Saskatoon with Beatty Substation and the Squaw Rapids Generating Station.

Two new substations were completed at Prince Albert. One of these stations will step-down voltages from 138 kv. to 72 kv., the other from 72 kv. to 14.4 kv. Substations to step-down voltages from 72 kv. to either 25 kv. or 14.4 kv. were built at Yorkton, Cudworth, Willow Bunch, Midale, Steelman and Moose Jaw.

At the end of the year, about 58,850 farms were being supplied with electric power, an increase of 1,500 during the year.

CITY OF REGINA

The City of Regina reported the construction of a 5,000-kva. substation in 1962.

Manitoba

The Province's hydro-electric generating capacity was not increased during the year. Moreover, no increase is expected until 1964 when 300,000 hp. of new hydro-electric capacity is scheduled to be placed in service.

In the field of thermal-electric generation, only 1,180 kw. of new capacity was placed in operation. As in the Province of Saskatchewan, the substantial amount of hydro-electric capacity soon to become available has modified, at least for the present, the need for developing thermal-electric generating facilities.

MANITOBA HYDRO

Construction at the site of Manitoba Hydro's Grand Rapids development on the Saskatchewan River proceeded at a favourable rate in 1962. Initial installation at this site will comprise three 150,000-hp. adjustable-blade Kaplan turbines operating under a normal head of 120 feet, and three generators, each rated at 110,000 kw. at 0.95 power

factor. Two units are scheduled to commence operation in late 1964 and the third unit in early 1965. Provision is being made for the eventual addition of a fourth unit.

At the Grand Rapids project, curtain grouting of the limestone bedrock underlying some 18 miles of dyke line was 75 per cent complete at the year's end. Dyke construction is on schedule and 4,500,000 cubic yards of fill and granular materials, approximately half of the total required, has been placed. Excavation for the spillway, intake and powerhouse has been completed and about two-thirds of the 350,000 cubic yards of concrete for these structures was scheduled to be placed by the end of the year.

Manitoba Hydro reports that a mobile diesel-electric plant with total generating capacity of 2,200 kw. is being used to facilitate construction at the Grand Rapids site; however, this plant will be removed from service as soon as hydro-electric power is available.

Plans for the transmission of Grand Rapids power call for the construction of two single-circuit, 230-kv. lines which will extend southward some 260 miles to the Rosser Terminal Station near Winnipeg. It is of interest to note that these 230-kv. transmission lines will be the first in Manitoba to operate at this voltage. A switching station which will permit the bussing of the new lines will be constructed at Ashern, midway between the Grand Rapids Development and the Rosser Terminal Station. Clearing of transmission line right-of-way was started in 1961 and was scheduled for completion in 1962. From Ashern, the line southward to Rosser Terminal Station was under construction in 1962, with completion scheduled for 1963; the northward extension is not due to begin until early in 1963, with completion of this section expected in 1964. The Rosser Terminal Station, which will serve as a major supply point in the Southern Manitoba System, and the Ashern Switching Station are both under construction for initial service in 1963.

The initial stage of the Kelsey Generating Station on the Nelson River was completed in 1961 and, other than normal maintenance, no further construction has been undertaken at this site. However, engineering studies of the reach of river between Lake Winnipeg and Sipiwesk Lake were continued during the year and contour maps are being prepared to facilitate more detailed studies of other Nelson River power sites.

In the thermal-electric field, Manitoba Hydro placed in service in July an additional unit of 1,100 kw. at The Pas Generating Station. The new unit raises the total generating capacity of the plant to 5,250 kw. in five units.

A diesel generating station consisting of two 40-kw. units was constructed at Baker's Narrows, 20 miles south of Flin Flon. This station will serve the nearby Flin Flon airport. Provision has been made in the plant building for two additional units.

In addition to the transmission facilities reported above for the Grand Rapids project, several other major terminal stations and transmission lines were under construction during the year. A single-circuit, 230-kv. steel-tower line, 130 miles long, was under construction to connect the Brandon Generating Station with the Rosser Terminal Station, while at Brandon, a 230-kv. switch structure was being constructed to provide for termination of the new line. Major extensions to existing terminal stations at Virden, Treherne and Whiteshell were under way for completion in 1963. New terminal stations, one to serve the Selkirk area and another to be located in the southwest sector of Greater Winnipeg, were in the preliminary design stages. Construction of a 115-kv. single-circuit, wood-frame transmission line was expected to be completed in 1962 to span the 101 miles between the Dauphin Terminal Station and the Minitonas Substation. Preliminary engineering work was under way on two similar lines, one to connect the Oakville Terminal Station with the Treherne Terminal Stations, a distance of 34 miles, and the other, 85 miles long, to connect the Neepawa Terminal Station with the Birtle Substation.

Because of increased demands for power, both for industrial and domestic uses, Manitoba Hydro had some 35,000 kva. of new substation capacity under construction in urban and suburban areas of Winnipeg, while about 49,000 kva. of new substation capacity and 43,250 kva. of terminal station capacity were to be placed in service in rural areas. Construction of 103.8 miles of 66-kv. transmission line and 16 miles of 33-kv. line also was expected to be completed during the year in rural Manitoba.

At the end of the year, Manitoba Hydro was supplying electricity to 39,080 farms.

CITY OF WINNIPEG HYDRO-ELECTRIC SYSTEM

The City of Winnipeg did not make any change in its generating capacity other than to make repairs to its Pointe du Bois Hydro-Electric Generating Station on the Winnipeg River and improvements to its Amy Street Thermal-Electric Plant.

Substation No. 22, with an initial capacity of 22,500 kva., was completed in 1962 to serve the southeast section of the city. The Central Control Station, which is to provide remote control operation for the system substation network, was scheduled for completion in 1962; however, three substations remained to be connected into the system.

Ontario

For the first time in seventeen years, there was no increase in the Province's total installed hydro-electric capacity. In thermal-electric development, however, the year 1962 saw the addition of 320,000 kw. of generating capacity.

For many years, electric energy generated in hydro-electric plants satisfied most of the demand for power in the province. More recently, the emphasis on developing thermal-electric power has grown, largely because most of the hydro-electric sites located within economic transmission distance of demand centres in Southern Ontario had already been developed. However, recent developments in extra-high-voltage transmission techniques have increased significantly the distance over which electric power may be carried economically. This has led to the investigation of a number of hydro-electric power sites whose development previously was considered uneconomic because of their remote locations. Several of these sites now are under development. Meanwhile, the generation of thermal-electric power can be expected to assume an increasingly important role.

As far as can be estimated at present, hydro-electric developments under construction or in the planning stage will increase the Province's total turbine capacity by 1,496,000 hp. Of this total, 288,000 hp. is scheduled for operation in 1963, while the remainder, much of it unscheduled, will be brought into service in later years. In the thermal-electric field, an increase in generating capacity of 400,000 kw. is expected in 1963, while a further 1,100,000 kw. is forecast for later years.

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

The Commission estimates that, over the next five years, power loads will increase at a compound rate of approximately six per cent per annum. To meet this increasing power load, the Commission, during 1962, was engaged in the construction or planning of eight generating stations - four hydro-electric, two conventional thermal-electric and two nuclear thermal-electric. In addition, extensive engineering investigations are being carried out at a number of potential power sites on rivers in the James Bay watershed. Studies of the Madawaska River, to be completed in 1963, may indicate the possibility of developing another site on this river. Other potential sites within reach of present demand areas are located on the Montreal, English and Mississagi Rivers.

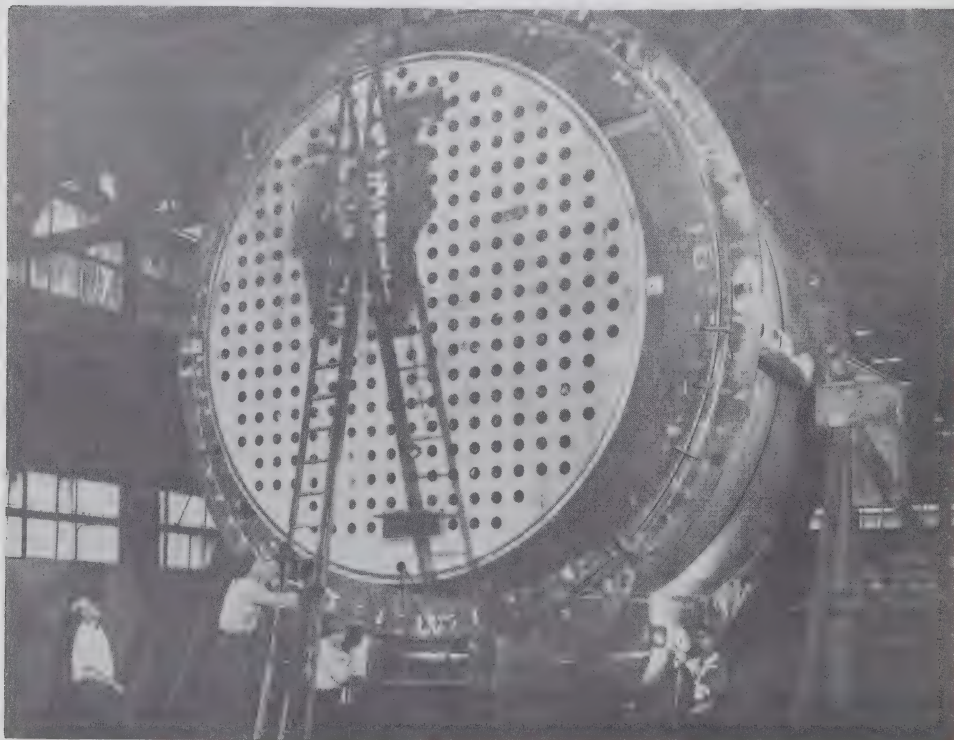
There is also considerable interest in the development of pumped-storage installations, such as the pumping-generating station at Niagara Falls which permits the conversion of surplus off-peak power into valuable peak capacity. A similar installation at present under

consideration would be capable of delivering more than a million kilowatts over the period of peak demand in the Southern Ontario System.

The hydro-electric stations under construction or in the planning stage during the year are the Otter Rapids Generating Station on the Abitibi River and the Little Long, Harmon and Kipling Stations on the Mattagami River.

The Otter Rapids Generating Station, with two units already in service, is being expanded by the addition of two units scheduled for service in 1963. Each of the four units consists of a turbine rated at 60,000 hp. under a head of 107 feet, coupled to a generator rated at 43,700 kw. The headworks and part of the substructure for the two additional units and headworks for the possible eventual installation of a further four units were provided in the first stage of construction at the station. By the end of 1962, superstructure steel for the second stage was in place, the substructure for units 3 and 4 was being completed, and erection of the turbines for these units had begun. The operating head at the station will probably be increased by about two feet with the completion of the tailrace area excavation.

Work has begun on the diversion of the Little Abitibi River into the Abitibi River upstream from the Otter Rapids Station. The increase in flow in the Abitibi River resulting from the diversion of the Little



Fabrication of reactor vessel for Douglas Point Nuclear Power Station

Abitibi via Newpost Creek and two miles of canal will increase the power potential, not only of the Otter Rapids Station, but of other sites downstream. The works for diverting the Little Abitibi are scheduled for completion in the autumn of 1963.

At Little Long Generating Station, the construction programme calls for the installation of two units in 1963. The turbines are rated at 84,000 hp. each, under a head of 90 feet, and the connected generators have a capacity of 57,000 kw. each. There is provision at the station for the installation of two additional units at a later date. The dam at Little Long Generating Station will consist of a central concrete structure about 2,800 feet long, flanked on both sides of the river by earth-fill dikes with a total length of approximately five miles. The concrete structure incorporates two spillway sluices, the headworks and powerhouse, and a total of over 2,000 feet of gravity section.

The earth dikes have been completed and the only part of the gravity section yet to be finished is the eastern end which is located in the river channel and is now under construction behind cofferdams. Concreting for the headworks for four units is almost complete, and headgates are partly installed. The penstocks for units 1 and 2 are in place, the powerhouse superstructure steel has been erected, and the placing of concrete for the powerhouse is virtually complete. Excavation of the tailrace channel is almost finished.

At the Harmon Generating Station, the schedule calls for the installation by 1965 of two units of 94,000 hp. each, operating under a head of 102 feet, with provision for two additional units at a later date. Preparations for cofferdam construction have begun, and a diversion channel to carry the river around the construction area is being cut. This channel will involve the excavation of 45,000 cubic yards of rock.

At the site of the Kipling Generating Station, topographic surveys and diamond drilling investigation to determine the most suitable arrangement for the proposed earth dams have been completed. The Kipling plant will house two units of 94,000 hp. each, operating under a head of 102 feet, and provision will be made for the eventual installation of two more units. Units 1 and 2 are scheduled for service in 1966.

An interesting aspect of the development of the lower Mattagami River is a plan to divert flood flows around the sites of the three generating stations. This will be achieved by diverting flood waters into Adam Creek, which has its source about one mile above the uppermost plant and which joins the Mattagami River some distance below the lowermost plant. When the headpond is filled at the Little Long Station, a control structure, already completed, will divert flood waters via Adam Creek past all three generating stations and back into the Mattagami River below the Kipling Station. A considerable saving in capital expenditure will be affected by this plan, as flood control structures will not be necessary at the two downstream plants.

Completion of the Robert Moses Niagara Power Plant of the Power Authority of the State of New York necessitated the extension of the Niagara River Remedial Works to adequately control water levels in the Chippawa-Grass Island Pool during periods of maximum diversion as provided by the 1950 Niagara Treaty. Construction of the extension to the remedial works and of other related structures was started in 1961 and progressed satisfactorily during the year. Concrete training walls parallel to the Canadian shore and extending 1,700 feet upstream and 2,000 feet downstream from the Chippawa-Grass Island Pool Control Structure have been completed. The placing of concrete for the five-gate extension to the present thirteen-gate Control Structure has been completed, and the five 100-foot wide gates are expected to be in service by the summer of 1963. In addition to maintaining adequate water levels the remedial works are designed to facilitate the passage of ice down the river. To ensure the virtual elimination of the likelihood of ice jams seriously affecting flows at station intakes, the Commission and the Power Authority took steps to remove high spots on the river bottom which had restricted the passage of ice. Such accumulations of ice as may occur will be dispersed by ice-breakers.

The two conventional thermal-electric stations under construction during 1962 were the Lakeview Generating Station near Toronto, and the Thunder Bay Generating Station at Fort William.

A second 300,000-kw. unit was installed in the Lakeview Station bringing the total generating capacity to 600,000 kw. Erection of primary structural steel for units 3 and 4 is complete, and concrete has been placed for the unit 4 turbine block. Installation of the turbo-generator for unit 3 has commenced and erection of the boiler is well under way. Unit 3 is scheduled to go into service in 1963, unit 4 in 1964, unit 5 in 1966 and unit 6 in 1967 or later. The ultimate capacity of the station will be 1,800,000 kw.

At the Thunder Bay Generating Station, testing of the 100,000-kw. unit has indicated the need for a number of modifications to certain equipment. These modifications, now being carried out, have delayed the in-service date from the spring of 1962, as originally scheduled, to 1963.

The 20,000-kw. Nuclear Power Demonstration Station near Rolphton, Ontario, was built as a joint undertaking of the Commission, Atomic Energy of Canada Limited and the Canadian General Electric Company Limited. Operation of the reactor commenced on 10 April 1962 and 16 hours later, on 11 April, the critical stage was reached. On 4 June, following a number of tests on the reactor, the station produced its first electric power and has performed satisfactorily since that time. The success of its operation is a matter of widespread interest in many parts of the world.

The Douglas Point Nuclear Station on the shore of Lake Huron is being built jointly by the Commission and Atomic Energy of Canada Limited. Concrete work for the interior floors and walls continued in

several buildings, including the reactor, service, turbine, water-treatment, pumphouse, and administration buildings. In the reactor building, the placing of heavy concrete and the installation of the coolant tubes for the reactor vessel have been completed. In the turbine building, the placing of concrete for the turbine block and the installation of the powerhouse crane have been completed. The intake for cooling water from the lake has been completed and the cofferdam has been removed. The station, with a total generating capacity of 200,000 kw., is scheduled for service in 1965.

During 1962, the Commission's transmission line network was expanded by the net addition of 149 circuit miles to bring the total to 18,120 circuit miles. The rural distribution system was extended by the net addition of approximately 470 miles of line, and at the end of the year, more than 48,530 miles of rural distribution line were in service to supply approximately 505,000 rural customers.

The Commission plans to transmit power at 230 kv. from the Otter Rapids, Little Long, Harmon, and Kipling Generating Stations to the Pinard Transformer Station, from which all four generating stations will be remote-controlled. From the Pinard Transformer Station, now under construction near the Abitibi Canyon Generating Station, power will be transmitted, initially at 230 kv. and eventually at 460 kv., over an extra-high-voltage transmission line which will extend southward to the Toronto area, a total distance of more than 430 miles. Construction of this line will be completed as far south as Sudbury in 1963, and to Kleinburg in the Toronto area by 1966.

GREAT LAKES POWER COMPANY LIMITED

The Company is giving active consideration to the development of a hydro-electric power site on the Montreal River. Plans call for the construction of a combination concrete and earth dam, and a power station housing a single unit with a generating capacity of 15,000 kw. The schedule indicates initial operation in 1964.

The Company has under consideration the addition of a third unit for service in 1966 at its Lower Falls Generating Station on the Montreal River. The generating capacity of the proposed unit would be 21,000 kw., raising the total generating capacity of the Lower Falls plant to 37,200 kw.

Québec

In the Province of Québec, the year 1962 saw no slackening in the current programme to develop the province's extensive water power resources. A total of 240,000 hp. of new hydro-electric capacity was

installed during the year and a further 480,000 hp. is expected to be in service by the end of 1963. In the years subsequent to 1963, the current construction programme will yield more than 5.2 million hp. of new capacity. In addition, the flow regulation resulting from the construction of storage on the Manicouagan and Outardes Rivers will permit an estimated 627,000 hp. increase in capacity at two existing downstream developments.

Although the increase in thermal-electric generating capacity amounted to only 80 kw. in 1962, construction of a 300,000-kw. thermal station went ahead, and tentative plans were made for the building of another station, with a generating capacity of 10,000 kw.

In recent years, the Government of Québec has given attention to the possibility of acquiring the assets of 11 private electrical utilities in the Province. The recent mandate given by the November 1962 Québec elections may result in some definite action in this respect. The 11 companies under consideration include the Shawinigan Water and Power Company and the Gatineau Power Company referred to hereunder.

QUEBEC HYDRO-ELECTRIC COMMISSION

The 1961 edition of this bulletin reported the installation of the tenth 73,700-hp. unit at Beauharnois in the third and final stage of this development. This brings the total turbine capacity for the 38 units in this project to 2,161,000 hp., the largest capacity of any Canadian plant. Provision has been made in the powerhouse for the installation of one more unit which would bring the ultimate capacity to 2,234,700 hp.

Construction of the Carillon development on the Ottawa River continues. Initial operation of the plant occurred in 1962 and by the end of the year, four units totalling 240,000 hp. had been placed in service. The Carillon development, expected to be complete in 1964, will have a total installed turbine capacity of 840,000 hp. in 14 units. The units comprise 60,000-hp. turbines, operating under a head of 61 feet, connected to 45,000-kw. generators.

During the year, the Commission continued its studies relating to the proposal to increase the installed capacity of its Rapid II plant on the upper Ottawa River. The proposed expansion of generating facilities at the plant will involve the installation of one 16,000-hp. turbine connected to a 12,000-kw. generator. The date of installation for this unit has not, however, been decided.

Construction progresses on the huge Manicouagan-Outardes development scheme. This ambitious project involves the harnessing of the headwaters of the Manicouagan and Outardes Rivers, both of which empty into the St. Lawrence River near Baie Comeau. Development of three major sites on the Manicouagan River will yield

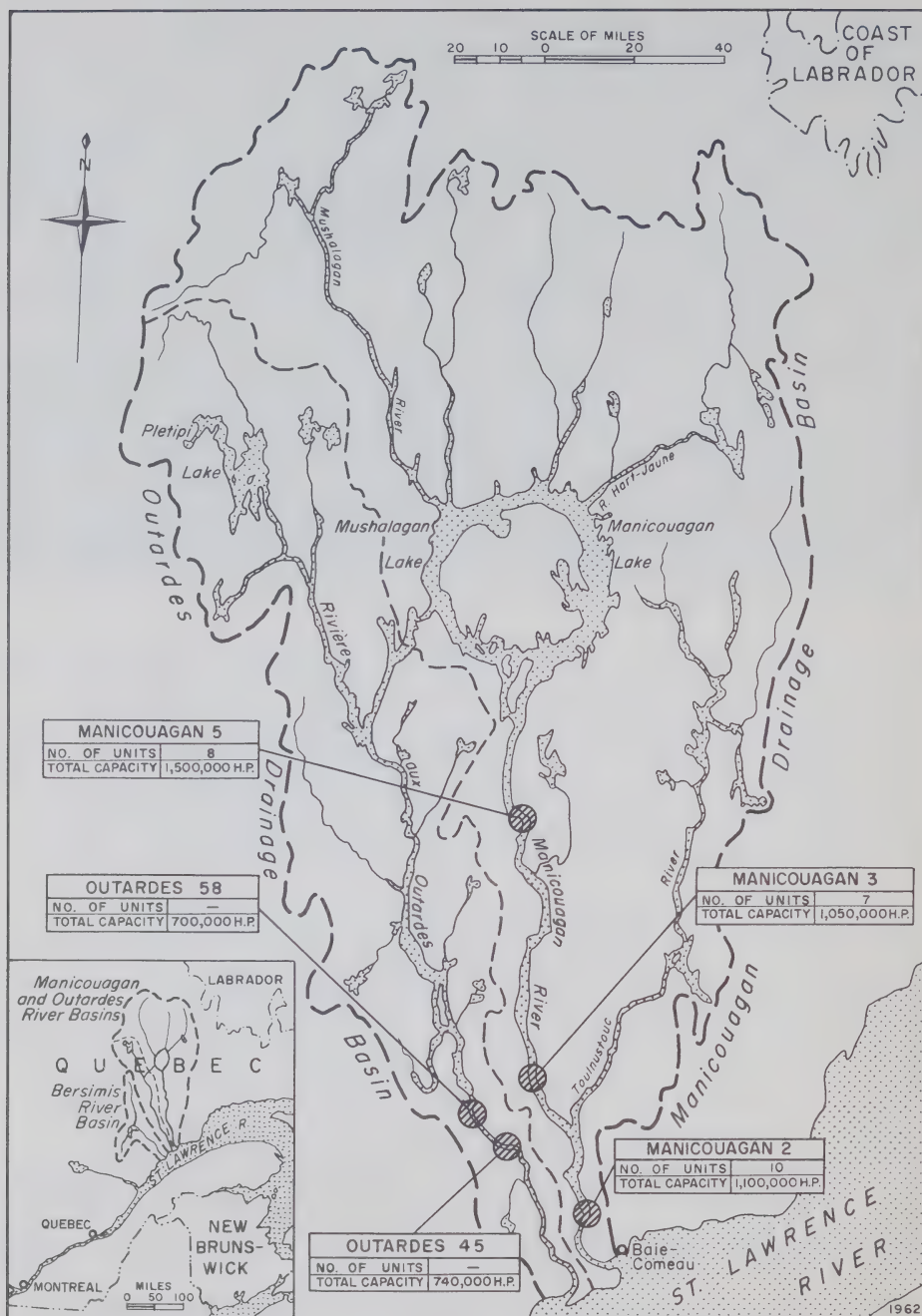


Carillon Hydro-Electric Development on the Ottawa River

3,650,000 hp., while a further 1,440,000 hp. can be produced at two sites on the Outardes River. Flow regulation from upstream storage reservoirs on both the Manicouagan and Outardes Rivers will benefit existing downstream plants to the extent of permitting an increase in capacity at the Manicouagan Power Company's McCormick Dam Project near Baie Comeau from the present figure of 292,400 hp. to about 580,000 hp., and at the Quebec North Shore Paper Company's Outardes Falls plant from the existing installation of 70,600 hp. to 410,000 hp.

At the Manicouagan 5 site, situated just below the outlet of Manicouagan Lake, a start has been made on what will be one of the highest and most massive dams of its kind in the world. The dam, a buttressed, multi-arch concrete structure, will be 4,000 feet long and 650 feet high. The pillars of the main arch will be 450 feet apart, with those of the other arches 295 feet apart. This huge structure, expected to take eight years to complete, will create a reservoir containing 115 million acre-feet of water and covering a surface area of 800 square miles. The powerhouse is designed to house 8 units with a total installed capacity of approximately 1.5 million horsepower, operating under a head of 505 feet. The original plans called for the incorporation of the powerhouse in the base of the main arch, but in the revised design, the powerhouse will be constructed on the east side of the river channel.

During the year, the cofferdams designed to protect the main dam site during construction, were completed and the shielded area excavated to bedrock, a depth of 280 feet. Construction of the dam has been started in this great excavation.



Hydro-electric power developments under construction or proposed on the Manicouagan and Outardes Rivers

The Manicouagan 2 site is located about ten miles from the mouth of the Manicouagan River. The proposed development of this site involves the installation of 10 units of 110,000 hp. each, operating under a head of 240 feet. By the end of 1962, preliminary construction was well advanced with the completion of diversion tunnels, bridge, and construction camp sites. Power is expected to be available from Manicouagan 2 before the end of 1965.

The third major site scheduled for development on the Manicouagan River is Manicouagan 3, a series of falls about 50 miles from the mouth of the river. At this site, a rock-fill dam will impound 8 million acre-feet of water. The powerhouse will be built underground and will house 7 units of 150,000 hp. each, operating under a 310-foot head.

Surveys carried out on the Outardes River have established the feasibility of developing substantial amounts of power at the Mile 58 and Mile 45 sites, so designated because of their respective distances from the mouth of the river. The installed capacities of the two generating stations will be 700,000 hp. at Outardes 58 under a head of 425 feet, and 740,000 hp. at Outardes 45, under the same head.

In the field of electric power transmission, the Commission completed 215 miles of 220-kv. line to connect the Les Boules Gas-Turbine Plant with Québec City and to tie in with the Lower St. Lawrence Power Company's transmission system. This line also makes possible an interconnection with the transmission system of the New Brunswick Electric Power Commission. A double-circuit 120-kv. line to connect the Carillon Generating Station with Montreal was almost complete by the end of the year. Each of these lines will be capable of carrying a 270,000-kw. load during peak periods. The first line, 41 miles long, will terminate at Fleury Substation, and the second, 43 miles long, at the Charland Substation. These two substations are located on the Island of Montreal, near the Canadian National Railways' belt line spurs running from Ville St. Laurent to the eastern tip of the island. Clearing has started along the right-of-way for a 120-kv. line, 132 miles long, from Pandora Substation near Cadillac to Mattagami. This line will carry power to supply the Lac Mattagami Mines. Clearing work is in progress for the construction of a 161-kv. line from Murdockville to Chandler to supply power for a new paper mill.

A significant development in the field of electric power transmission is a decision by the Commission to transmit power from the Manicouagan complex to the Quebec-Montreal system at 700/725-kv. This transmission voltage is the highest presently planned for long-distance transmission anywhere in Canada.

THE SHAWINIGAN WATER AND POWER COMPANY

The Company has postponed indefinitely its plans for construction

of a 210,000-hp. development at Rapide-des-Coeurs on the St. Maurice River. The Rapide-des-Coeurs plant is designed to house four 42,000-hp. units operating under a nominal head of 95 feet, with provision for a fifth unit. Initial operation had originally been scheduled for 1965.

Construction of the 300,000-kw. thermal-electric plant at Tracy near Sorel on the south shore of the St. Lawrence River is going ahead on schedule and the first of two 150,000-kw. steam turbines is expected to be in operation in July 1964. The second unit is scheduled for installation in July 1965.

The Tracy Generating Station will be tied into the Company's transmission system and 320-kv. lines to Sorel and St. Césaire will supply the Southern Canada Power Company's system through a substation at present under construction. A 345-kv. transmission line between Isle Maligne and Quebec City's new No. 2 Terminal Station was completed and brought into service in July 1962. A 60-kv. extension to the line feeding the new substation at St. Agapit was completed and a terminal station was built to service l'Assomption area.

The Company reported that electric power was being provided to 41,351 farms.

ASBESTOS CORPORATION LIMITED

The Corporation has announced tentative plans to build a thermal-electric plant with associated substation and transmission facilities at Asbestos Hill in the Ungava region. As proposed, the plant would consist of six to eight diesel units with a total capacity of 10,000 kw. for initial service between 1966 and 1970. Power from the plant would be used to operate an asbestos mill and supply the requirements of a townsite with a population of about 1,000 people.

GATINEAU POWER COMPANY

The Company increased the voltage of the transmission line between Low and Maniwaki from 26.4 kv. to 69 kv., and put 69-kv. distribution substations into service at Maniwaki, Messines, and Gracefield. The 26.4-kv. lines between St. Jovite and l'Annonciation and between New Glasgow and Rawdon were reconstructed to carry power at 69 kv., the changeover to take place in 1963. Most of the associated substations were rebuilt for 69 kv.

The Company now operates a mobile distribution substation designed to operate with a variety of voltage ratios. The substation can be moved quickly to any part of the system to restore service in the event of a substation failure.

The transmission voltages of a number of distribution systems were increased to 14.4/25.0 kv. The total mileage of rural distribution lines was expanded by 100 miles and, by the end of the year, the Company was supplying power to about 9,200 farms.

L'OFFICE DE L'ÉLECTRIFICATION RURALE

At Baie Johan Beetz in Duplessis County, a thermal-electric generating plant consisting of two 40-kw. diesel units was built. The area supplied by this plant is now receiving electric power for the first time.

The bureau, which is an agency of the Government of Québec, has completed a 34.5-kv. transmission line from Magpie Substation for a distance of 40 miles along the north shore of the St. Lawrence River to Hâvre St. Pierre in Duplessis County. A 750-kva. distribution substation was built at Hâvre St. Pierre on behalf of the "Coopérative d'Électricité du Golfe St-Laurent".

A 69-kv. transmission line, 22 miles long, was constructed to connect Anse Pleureuse on the south shore of the St. Lawrence River with the mining town of Murdockville in the heart of the Gaspé Peninsula. At Anse Pleureuse, the bureau constructed a 5,000-kva. substation for the "Coopérative d'Électricité de Gaspé-Nord".

The 69-kv. transmission line between Gaspé village and Grand Rivière was extended some 10 miles to Chandler, where a 7,500-kva. substation was constructed for the "Coopérative d'Électricité de Gaspé-Sud".

CITY OF MÉGANTIC

The City of Mégantic's 4,500-hp. Gayhurst Hydro-Electric Station on the Chaudière River ceased operation in April 1962. During the spring break-up, high flows in the Chaudière River threatened to wash out the earth dam at the power site and, to avert a major disaster involving enormous damage to property and possible loss of life, a relief channel was cut to by-pass the dam and relieve pressure on the weakened structure. Because of the unrestricted flow through the emergency channel, the headpond cannot be maintained at a level high enough to permit operation of the turbines.

The City is supplying its customers with power purchased from the Shawinigan Water and Power Company.

PEMBROKE ELECTRIC LIGHT CO. LIMITED

The Company reports the construction of a 44-kv. transmission

line from its hydro-electric station at Waltham to Fort Coulonge, a distance of 9 1/2 miles. This line is designed not only for present requirements, but also for use in connection with possible future development of power on the Coulonge River.

SAGUENAY TRANSMISSION COMPANY LIMITED

The Company reports that two 30,000-kva. transformer units are being installed at its Jonqui re Substation, replacing two 15,000-kva. units. By the end of the year, the new units are expected to be in service, transforming from 154,000 to 26,000 volts.

DEPARTMENT OF NATURAL RESOURCES - PROVINCE OF QU BEC

Throughout the year, the Water Resources Branch of the Department of Natural Resources maintained the desired regulation of flow on the St. Maurice, Gatineau, Li vre, North, St. Anne-de-Beaupr , St. Fran ois, du Loup, and Mitis Rivers by the operation of a system of 29 storage dams and reservoirs.

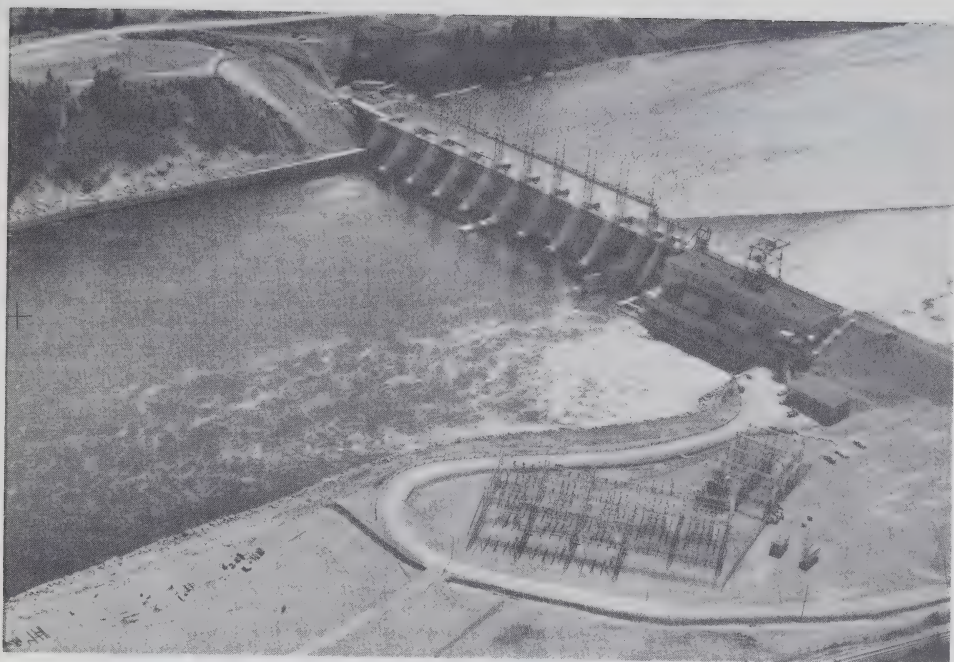
New Brunswick

New Brunswick's hydro-electric turbine capacity was increased during the year by the addition of 55,468 hp. No additions are anticipated for 1963 but various proposals under study could add significantly to the Province's hydro-electric capacity in subsequent years.

Thermal-electric development in the Province amounted to 50,240 kw. in 1962. Of this amount, 50,000 kw. was reported in error to have been put into service in 1961. Indications are that the next addition to the Province's total thermal capacity will be the installation of 60,000 kw. in 1964.

NEW BRUNSWICK ELECTRIC POWER COMMISSION

The third and final unit at the Commission's Beechwood Plant on the Saint John River was placed in service in April, raising the total capacity of this development to 145,000 hp. While this new unit completes the presently scheduled construction on the Saint John River, preliminary engineering studies were continued on the proposed



Beechwood Hydro-Electric Development on the Saint John River

600,000-hp. Mactaquac development upstream from Fredericton. Attention is also being given to the possible extension of the Grand Falls development, where a large amount of energy is still available.

On the St. Croix River, the Commission's Milltown plant capacity was increased by the installation of a 468-hp. unit in May. The new unit raises the plant capacity to 4,208 hp. in five units.

In the thermal-electric field, the Commission installed a 50,000-kw. unit in its Courtenay Bay Station at East Saint John. As previously reported, this unit was installed in 1961, but was not put into service until April 1962. Ultimate generating capacity at the Courtenay Bay Station is 300,000 kw.

The Commission added a 240-kw. unit at its Grand Manan Station early in 1962, bringing the total installation to 990 kw., and was installing a 60,000-kw. unit at Newcastle Creek on Grand Lake for service in 1964.

The Commission reports that construction was completed for 195.8 miles of 138-kv. and 78.2 miles of 69-kv. transmission lines. At substations in Saint John and Edmundston, capacities of 5,000 kva. and 10,000 kva., respectively, were being installed.

Approximately 26,200 farms were being supplied with electric power by the end of 1962, including 30 which were connected to the Commission's distribution system during the year.

CITY OF EDMUNDSTON

The City extended its substation capacity by the addition of a 10,000-kva. unit during 1962.

Nova Scotia

No new hydro or thermal-electric capacity was brought into operation during 1962 in the Province, nor was any construction under way on the installation of new capacity. Planning of several hydro-electric projects, however, is expected to lead to the installation of 22,000 hp. and possibly a further 90,000 hp. in the years ahead.

NOVA SCOTIA POWER COMMISSION

The Commission is actively considering the construction of two hydro-electric developments at Riverdale on the Sissiboo River and at Wreck Cove on Wreck Cove Brook. There is no indication as yet of when the construction of either development will commence. However, plans for the Riverdale development call for the installation of a single 8,000-hp. unit operating under a 90-foot head, while estimates for the Wreck Cove plant indicate a possible ultimate capacity of 90,000 hp.

During 1962, main transmission lines completed by the Commission involved eleven miles at 138 kv., 0.6 miles at 69 kv., and 3 miles at 29 kv. A further 22 miles at 23 kv. were under construction at the end of the year. Completion of rural distribution lines during the year totalled 16.5 miles.

NOVA SCOTIA LIGHT AND POWER COMPANY LIMITED

The Company is giving active consideration to the construction of hydro-electric developments on the Allain (Lequille River) at Lequille and also on the Nictaux River at Alpena. However, the Allain River development, which will comprise a 7,500-hp. unit operating under a head of 370 feet, is not expected to be completed until at least 1970. The Nictaux development, with a single 6,500-hp. unit under 60 feet of head, is not expected to be in service before 1968.

During 1962, the Company energized 42.5 miles of 69-kv. transmission line and 1.6 miles of 23-kv. line. A total of 22.8 miles of rural distribution line also came into service.

EASTERN LIGHT AND POWER COMPANY LIMITED

During 1962, the Company installed slightly more than 4 miles of 23-kv. transmission line and was constructing another 5.5 miles of similar line at the end of the year. Two miles of rural distribution line were also completed by the Company.

SEABOARD POWER CORPORATION LIMITED

The Power Corporation was constructing a 20,000-kva. substation in Sydney in 1962.

Prince Edward Island

Prince Edward Island depends almost exclusively on thermal-electric generation to satisfy its power needs, and in 1962 increased its total thermal capacity by 2,200 kw.

TOWN OF SUMMERSIDE

For the second consecutive year, the capacity of the Summerside plant was increased by the installation of a 2,200-kw. unit. Total generating capacity of the plant is now 7,281 kw. in nine units.

A total of 15 miles of distribution line was added to the town's system in 1962.

MARITIME ELECTRIC COMPANY LIMITED

The Company reports the completion of 35 miles of distribution line in 1962. Some 490 new farm customers were provided with service in 1962, bringing the number of farms supplied by the Company to 15,530.

Newfoundland

Newfoundland's hydro-electric generating capacity was boosted in 1962 by the addition of 120,000 hp. in Labrador. A total of 128,000 hp.

of hydro-electric capacity is scheduled to be added in 1963, while active consideration is being given to the installation of another 191,000 hp. in later years.

In thermal-electric development, a total of 4,100 kw. of new generating capacity was brought into service during the year while a further 2,000 kw. is due to be added in 1963.

TWIN FALLS POWER CORPORATION LIMITED

The Corporation, which was formed by Hamilton Falls Power Corporation Limited, Iron Ore Company of Canada and Wabush Iron Company Limited, began initial operation of its Twin Falls development on the Unknown River in Labrador. Two 60,000-hp. units operating under a 290-foot head were brought into service in June 1962. Two identical units are scheduled to be added at this site in late 1963. Ultimate development at the site is expected to total 300,000 hp. in 5 units.

Construction of a 230-kv. line, 110 miles long, was completed between the Corporation's new plant and the centre of mining activity in the Wabush Lake area. An identical line, parallel to the first, was under construction at the end of the year.

NEWFOUNDLAND LIGHT AND POWER COMPANY LIMITED

During 1962, the Company began construction of a hydro-electric development on Sandy Brook. The plant, to be located some 8 miles west of the town of Grand Falls, will consist initially of a single 8,000-hp. turbine operating under a 115-foot head, and connected to a 5,950-kw. generator. The plant is due to commence operation in late 1963.

New capacity was installed in the Company's St. John's substations during the year, including a 15,000-kva. addition in the Kings Bridge Station and a 7,500-kva. addition in the Ridge Road Station.

SOUTHERN NEWFOUNDLAND POWER AND DEVELOPMENT LIMITED

The Company, a subsidiary of the British Newfoundland Corporation Limited, is planning to construct a hydro-electric generating station on the Salmon River at Head Bay d'Espoir. It is expected that initial installation will consist of 77,000 hp. in two units, operating under a head of approximately 550 feet. No information has as yet been released, however, with respect to the schedule of construction of this development. Ultimate development of the site may reach 350,000 hp.

WABUSH MINES

The Company reports that a 1,000-kw. diesel unit was added at its Wabush Lake Thermal Plant in 1962, bringing the total plant capacity to 2,000 kw. Two additional units of 1,000 kw. each are on order and are scheduled to be installed in the plant in 1963.

NEWFOUNDLAND POWER COMMISSION

During 1962, the Commission constructed a 300-kw. diesel plant at Upper Ferry and added new capacity at existing diesel plants. The additions comprise 400 kw. at Twillingate, 180 kw. at Burgeo, 100 kw. at Fogo, 80 kw. at Triton, 400 kw. at St. Anthony and 400 kw. at Happy Valley (Labrador).

A considerable amount of new transmission line was completed during the year, including 25 miles at 25 kv., 43.8 miles at 14.4 kv. and 33.4 miles at 7.2 kv. At the year's end, a further 16 miles at 14.4 kv., 8 miles at 12.5 kv. and 86 miles at 7.2 kv. were under construction.

UNITED TOWNS ELECTRIC COMPANY LIMITED

The Company reports the installation of an additional 1,240 kw. of diesel-electric generating equipment at its St. George's plant.

BOWATER POWER COMPANY LIMITED

The Company proposes to install a 54,000-hp. hydro-electric development operating under a head of about 683 feet on Hinds Brook. Construction of this development has not yet been scheduled.

During the year, construction on a 79-mile, 110-kv. transmission line continued between Howley and Baie Verte. At Howley, a 12,500-kva. substation was under construction to service the new line.

IRON ORE COMPANY OF CANADA

The Company completed construction of 13.5 miles of 44-kv. transmission line between its Carol Lake Thermal-Electric Plant and its mining operations nearby.

Yukon and Northwest Territories

During 1962, the total generating capacity of the Territories was increased by a net amount of 3,100 kw. of thermal-electric capacity, all of which was installed in the Northwest Territories. It is expected that 3,500 kw. of thermal capacity will be installed in the Northwest Territories in 1963.

NORTHERN CANADA POWER COMMISSION

To encourage the development of the resources of Northern Canada, the Government of Canada in 1948 established an agency now known as the Northern Canada Power Commission. The Deputy Minister of Northern Affairs and National Resources is Chairman of this Commission and the Director of the Water Resources Branch is a member. The Commission is empowered to construct and operate public utility generating stations in the Yukon and Northwest Territories and, subject to approval of the Governor General-in-Council, in any other part of Canada.

In 1962, the Commission installed a 600-kw. diesel unit at its Fort Simpson plant to meet the increasing power requirements of the community, the airport, and federal government installations. The total generating capacity of the Fort Simpson plant is now 1,075 kw.

At the Fort Smith plant, a 400-kw. diesel unit was added, bringing the total installed capacity of the plant to 2,275 kw.

At Frobisher Bay, construction of a new power and central-heating plant was begun in 1962 to serve the general Frobisher Bay area. Two 1,000-kw. units will be transferred to the new plant from the existing Frobisher Bay plant, and two new 1,000-kw. units will be installed, to give the new plant a total generating capacity of 4,000 kw. in four units. The four 250-kw. units remaining at the old plant will be operated by the Department of Transport for its own use.

The Commission expects to install a 1,500-kw. diesel unit at the Inuvik plant in 1963, increasing the total capacity of the plant to 3,960 kw.

During the summer of 1962, an investigation of a hydro-electric power site on the Taltson River at a point about 35 miles northeast of Fort Smith was investigated to determine the feasibility and the costs of developing the site as a source of power for the Fort Smith and Pine Point Mines area. As a result of the investigation, the Commission considers that an initial installation of 25,000 hp. is feasible at the site.

CANADA TUNGSTEN MINING CORPORATION LIMITED

The Corporation reports the installation of four diesel units at its Flat River mining operation. Three of these units are rated at 500-kw. each, and the fourth, which is a stand-by unit, is rated at 100 kw., bringing the total installed capacity to 1,600 kw.

NORTHLAND UTILITIES LIMITED

The Company reports that, in 1962, one 652-kw. diesel unit was installed at the Hay River plant. At the same time, two units totalling 152 kw. were removed from this plant.

Development of Electric Power Generating Facilities

Summary for 1962

Part I - Hydro

DEVELOPMENT		RIVER		HYDRO - E L E C T R I C C A P A C I T Y											R E M A R K S
				INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962		PROPOSED FOR INSTALLATION							
								IN 1963			AFTER 1963				
								No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.	No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.	No. of Units	
British Columbia															
CONSOLIDATED MINING AND SMELTING COMPANY LIMITED															
		Waneta													
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY															
		Peace													

Coteau Creek	South Saskatchewan								3	180,000	-	Units 1 and 2 are scheduled for 1967, unit 3 for 1968.
TOTAL												
										187,600	136,000	-

Manitoba

MANITOBA HYDRO												
Grand Rapids	Saskatchewan								4	600,000	440,000	Units 1 and 2 scheduled for 1964, unit 3 for 1965. Provision for a fourth unit.
TOTAL												
										600,000	440,000	

Ontario

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO												
Otter Rapids	Abitibi								4	240,000	174,800	
Little Long	Mattagami	120,000	87,400	2	120,000	87,400	2	168,000	114,000			
Harmon	Mattagami			2	168,000	114,000						Completion of initial stage, 188,000 hp. in 2 units, scheduled for 1965.
Kipling	Mattagami						4	376,000		376,000	-	Completion of initial stage, 188,000 hp. in 2 units, scheduled for 1966.
GREAT LAKES POWER COMPANY, LIMITED												
Site 2A	Montreal								1	20,000	15,000	Under active consideration. Initial operation 1964.
Lower Falls	Montreal	21,800	16,200				1	28,000		28,000	21,000	Under active consideration. Initial operation 1964.
TOTAL												
					288,000	201,400				1,208,000	-	

DEVELOPMENT		RIVER	HYDRO - ELECTRIC CAPACITY										REMARKS						
			INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962		PROPOSED FOR INSTALLATION												
							IN 1963			AFTER 1963									
			No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.	Turbine hp.	No. Units	Total Turbine Capacity hp.	Total Generator Capacity kw.	No. Units	Total Turbine Capacity hp.	Total Generator Capacity kw.							
Québec			QUÉBEC HYDRO-ELECTRIC COMMISSION			4	240,000	180,000	240,000	180,000	8	480,000	360,000	2	120,000	90,000	Original schedule called for installation of 168,000 hp. in 4 units for service in 1965, with provision for one additional unit. Plans for development of site now postponed indefinitely. Increase of 287,600 hp. possible through regulation from upstream storage reservoirs Increase of 339,400 hp. possible through regulation from upstream storage reservoirs		
			Carillon	Ottawa															
			Rapide II	Ottawa				48,000	36,000						1	16,000		12,000	
			Manicouagan 5	Manicouagan											8	1,500,000		-	
			Manicouagan 3	Manicouagan											7	1,050,000		-	
			Manicouagan 2	Manicouagan											10	1,100,000		-	
			Outardes 58	Outardes											-	700,000		-	
			Outardes 45	Outardes											-	740,000		-	
			SHAWINIGAN WATER AND POWER COMPANY																
			Rapide des Coeurs		St. Maurice														
MANICOUAGAN POWER COMPANY																			
McCormick		Manicouagan				292,400	191,250												
QUÉBEC NORTH SHORE PAPER COMPANY																			
Outardes Falls		Outardes				70,600	50,000												
TOTAL			240,000	180,000								480,000	360,000		5,226,000	-			

Original schedule called for installation of 168,000 hp. in 4 units for service in 1965, with provision for one additional unit. Plans for development of site now postponed indefinitely.

Increase of 287,600 hp. possible through regulation from upstream storage reservoirs.

Increase of 339,400 hp. possible through regulation from upstream storage reservoirs.

New Brunswick

NEW BRUNSWICK ELECTRIC POWER COMMISSION																				
Beechwood	Saint John	1	55,000	40,500	145,000	112,500														
Milltown	St. Croix	1	468	350	4,208	3,036														
Mactaquac	Saint John																			
TOTAL			55,468	40,850																Preliminary studies for possible 600,000 hp. development.

Nova Scotia

NOVA SCOTIA POWER COMMISSION										Installation of one 8,000-hp. turbine coupled to a 6,000-kw. generator is under active consideration.	Installation of up to 90,000 hp. is under active consideration.
Riverdale	Sissiboo										
Wreck Cove	Wreck Cove Brook										
NOVA SCOTIA LIGHT AND POWER COMPANY LIMITED											
Lequille	Allain (Lequille)							1	7,500	5,600	
Alpena	Nictaux							1	6,500	5,000	
TOTAL										14,000	10,600

DEVELOPMENT		RIVER		HYDRO - ELECTRIC CAPACITY										REMARKS													
				INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962		PROPOSED FOR INSTALLATION																			
								IN 1963			AFTER 1963																
								No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.	No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.		No. of Units	Total Turbine Capacity hp.	Total Generator Capacity kw.										
<i>Newfoundland</i>																											
TWIN FALLS POWER CORPORATION LIMITED																											
Twin Falls		Unknown		2		120,000		93,600		120,000		93,600		2		120,000		93,600		1		60,000		46,800			
NEWFOUNDLAND LIGHT AND POWER COMPANY LIMITED																											
		Sandy Brook																									
SOUTHERN NEWFOUNDLAND POWER AND DEVELOPMENT LIMITED																											
Head Bay d'Espoir		Salmon																									
BOWATER POWER COMPANY LIMITED																											
		Hinds Brook																									
TOTAL						120,000		93,600										128,000		99,550				60,000.		46,800	
																Active consideration being given to installation of 77,000 hp. in 2 units.											
																Active consideration being given to installation of 54,000 hp.											

Northwest Territories

NORTHERN CANADA POWER COMMISSION												
	Taltson											Investigation carried out for hydro-electric development with initial installation of 25,000 hp.
NET TOTAL FOR CANADA		415,468	314,450					1,203,600	868,950		7,675,600	-

Part II - Thermal

DEVELOPMENT	Type	THERMAL - ELECTRIC CAPACITY							REMARKS	
		INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962 kw.	PROPOSED FOR INSTALLATION					
		No. of Units	Total Capacity kw.		No. of Units	Total Capacity kw.	No. of Units	Total Capacity kw.		
		No. of Units	Total Capacity kw.	No. of Units	Total Capacity kw.	No. of Units	Total Capacity kw.			
British Columbia										
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY										
Burrard	S	1	150,000	150,000	1	150,000	4	600,000	Unit 3 scheduled for service in 1964.	
Prince George	IC	2	2,000	23,000						
Chetwynd	IC	2	1,800	3,000						
Alert Bay	IC	1	150	1,200						
Sandspit	IC	2	1,200	1,200					2 units totalling 1,800 kw. removed from service. 3 units totalling 275 kw. removed from service.	
Williams Lake	IC			0						
Spences Bridge	IC			0						
BAMFIELD POWER AND LIGHT COMPANY										
Bamfield	IC	2	250	-					2 units totalling 1,800 kw. removed from service. 3 units totalling 275 kw. removed from service.	
MACMILLAN, BLOEDEL AND POWELL RIVER LIMITED										
Port Alberni	S	1	25,000	27,000						
Harmac	S	1	4,000	5,250	1	30,000				
TOTAL			184,400 2,075 182,325	(new capacity) (removed from service) (net increase)		180,000		600,000		
Alberta										
CALGARY POWER LTD.										
Wahamun	S	1	150,000	282,000					2 units totalling 90 kw. removed from service.	
NORTHLAND UTILITIES LIMITED										
Fort Vermilion	IC	1	75	-						

DEVELOPMENT	Type	THERMAL - ELECTRIC CAPACITY								REMARKS	
		INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962 kw.	PROPOSED FOR INSTALLATION						
		No. of Units	Total Capacity kw.		IN 1963		AFTER 1963				
					No. of Units	Total Capacity kw.	No. of Units	Total Capacity kw.			
Québec											
L'OFFICE DE L'ÉLECTRIFICATION RURALE	IC	2	80	80				2	300,000	Unit 1 scheduled for 1964, unit 2 for 1965.	
Baie Johan Beetz											
SHAWINIGAN WATER AND POWER COMPANY											
Tracy	S										
ASBESTOS CORPORATION LIMITED											
Asbestos Hill	IC								6-8	10,000	Tentative plans for 6-8 units, to come into service between 1966 and 1970.
TOTAL											

New Brunswick

NEW BRUNSWICK ELECTRIC POWER COMMISSION	S	1	50,000	50,000				
Courtenay Bay	IC	1	240	990			1	60,000
Grand Manan								
Grand Lake No. 3	S							
TOTAL			50,240					60,000
Previously reported as in service in 1961. Now reported as installed in April 1962. Ultimate total capacity of this plant will be 300,000 kw.								

Prince Edward Island

TOWN OF SUMMERSIDE	IC	1	2,200	7,281				
Summerside								
TOTAL			2,200					

Newfoundland

NEW FOUNDLAND POWER COMMISSION									
Upper Ferry	IC	1	300	300					
Twillingate	IC	1	400	-					
Burgeo	IC	1	180	780					
Fogo	IC	1	100	-					
Triton	IC	1	80	-					
St. Anthony	IC	1	400	-					
Happy Valley	IC	1	400	-					
UNITED TOWNS ELECTRIC COMPANY LTD.									
St. George's	IC	1	1,240	-					
WABUSH MINES									
Wabush Lake	IC	1	1,000	2,000	2	2,000			
TOTAL			4,100			2,000			

47

Northwest Territories

NORTHERN CANADA POWER COMMISSION									
Fort Simpson	IC	1	600	1,075					
Fort Smith	IC	1	400	2,275					
Frobisher Bay	IC			3,000	2	2,000			
Inuvik	D			2,460	1	1,500			

New station under construction to be completed in 1963. Two units of 1,000 kw. each to be transferred from existing station and two new units of 1,000 kw. each to be installed to bring total capacity of new station to 4,000 kw. Four units of 250 kw. each remaining at existing station will be operated by Department of Transport.

IC - Internal Combustion, S - Steam, N - Nuclear

DEVELOPMENT	Type	THERMAL - ELECTRIC CAPACITY								REMARKS	
		INSTALLED DURING 1962		TOTAL STATION CAPACITY AT END 1962 kw.	PROPOSED FOR INSTALLATION						
		No. of Units	Total Capacity kw.		IN 1963		AFTER 1963				
					No. of Units	Total Capacity kw.	No. of Units	Total Capacity kw.			
Northwest Territories (CONTINUED)											
CANADA TUNGSTEN MINING CORPORATION LIMITED	IC	4	1,600	1,600							
Flat River											
NORTHLAND UTILITIES LIMITED	IC	2	652	-							Two units totalling 152 kw. removed from this plant.
Hay River											
TOTAL			3,252 152 3,100	(new capacity) (removed from service) (net increase)				3,500			
NET TOTAL FOR CANADA											
			713,210					660,500		2,070,000	

